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PTO/SB/21 (6-98)
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TRANSMITTAL FORM

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Application Number	09/800,735
Filing Date	3/7/2001
First Named Inventor	McKinnon, Martin W.
Group Art Unit	
Examiner Name	
Total Number of Pages in This Submission: 209	Attorney Docket Number: 10263-33243

ENCLOSURES *(check all that apply)*

- [ ] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment / Response
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
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- [x] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
  - [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Assignment Papers *(for an Application)*
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- [ ] Proprietary Information
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Citations for IDS and Itemized Postcard

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Chad D. Tillman
Signature	Chad D. Tillman
Date	July 26, 2001

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application of:
McKinnon et al.)
Serial No.: 09/800,735)
Filed: March 7, 2001)
For: *Methods of Allocating Access Across*)
A Shared Communications Medium)

Charlotte, North Carolina

Commissioner for Patents
Washington, D.C. 20231

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

In compliance with the Applicant's duty of disclosure under 37 C.F.R. §1.56, Applicants bring the attached document or documents to the attention of the U.S. Patent and Trademark Office in accordance with the provisions of 37 C.F.R. §1.97-98. A copy of each document is enclosed and each document is listed on the enclosed Form PTO-1449. Applicant states that each patent listed on Form PTO-1449 was cited in an International Search Report for a PCT application not more than three months prior to the filing of this Information Disclosure Statement.

Applicant further states that the Data-Over-Cable Service Interface Specifications manual cited is representative of the current state-of-the-art at the time of the present invention. In this regard, Application submits the following statements as prior art to the present invention with appropriate citations to sections and page numbers from this manual.

An assumption of DOCSIS 1.0 is that no one user or type of traffic is to be given preferential treatment by any network element, whether a cable modem (CM) or a cable modem termination system (CMTS). DOCSIS 1.0 did introduce a limited form of traffic control with Class-of-service (CoS). Class-of-Service allows an operator to configure a CM to receive a guaranteed level of service by setting the "Guaranteed Minimum Upstream Channel Data Rate Configuration Setting" as set forth in Section C.1.1.4.5 (p. 230); or to receive a limited level of service by setting the "Maximum Downstream Rate Configuration Setting and Maximum Upstream Rate Configuration Setting" as set forth in Sections C.1.1.4.2 and C.1.1.4.3 (pp. 229-230). The rates—whether minimum or maximum—apply to all traffic associated with a CM with no distinction between types of traffic. It should be noted that maximum rates are not a

guarantee; rather, the maximum rates set the highest data transmission rate allowed given available bandwidth.

Service flows are provided for in DOCSIS 1.1 as set forth in Section 8.1.1.1 (pp. 122-124). A service flow represents a unidirectional flow of traffic between a CM and a CMTS associated with a particular Quality of Service (QoS). Quality of Service represents a more granular approach to traffic control compared to CoS. Not only may a service flow's maximum and minimum transmission rates be specified, but jitter (variance in delay) and latency on the upstream may also be configured. DOCSIS 1.1 also adds Scheduling Services for upstream service flows as set forth in Sections 8.2 (pp. 137-141) and C.2.2.6.2 (p. 263). There are several varieties of Scheduling Services, but the central idea is that a CMTS may grant a CM transmission opportunities on the upstream without having received a transmission request.

A modem may support multiple upstream and multiple downstream service flows, each configured with a different QoS. Furthermore, traffic requiring a particular QoS may be classified to a particular service flow. Since QoS allows one stream of traffic to take priority over another stream, time-sensitive and delay-sensitive traffic, such as Voice over IP (VoIP), may be processed with greater alacrity than less-demanding traffic like e-mail and ftp. Traffic matches to classifiers based on Layer 2 and Layer 3 criteria. Since each classifier is associated with a service flow, traffic matching a classifier is queued for transmission on the associated service flow as set forth in section 8.1.1.2 (pp. 125-126).

Service flows may be static or dynamic. Static service flows are configured in the configuration file with both the encodings that enumerate the flow's QoS parameter set and the classifiers that match to the flow. Flows may be activated at registration time; that is, they may have classifiers and accept traffic for transmission. Alternatively, flows may be provisioned, where they may not accept traffic but may be used as a template for the future addition of a flow. A dynamic messaging scheme allows flows to be added, changed, or deleted as needed. Dynamically-added flows reference the provisioned template to provide the limit of QoS parameters that the new flow may request. The resulting flow's QoS parameter set is some subset of the provisioned template provided in the configuration file. The request includes that subset in addition to the classifiers needed to direct the traffic to the new flow as set forth in Section 8.1.5 (p. 129).

The CM initialization process (a.k.a. "ranging and registering) is described in Section 9 (pp. 157-219). A CM joining a Data Over Cable network must first acquires a downstream channel from the CMTS as set forth in Section 9.2.1 (p. 159). After downstream acquisition, the CM waits for messages—Upstream Channel Descriptor and MAP—that describe the upstream

channel as set forth in Section 9.2.2 (pp. 160-161). The CM and CMTS then exchange ranging messages to adjust the CM's timing, power, and frequency settings as set forth in Section 9.2.4.1 (pp. 163–167). After making adjustments, the CM then contacts a Dynamic Host Configuration Protocol Server for IP address assignment as set forth in Section 9.2.5 (p. 167). The DHCP Offer includes the name of a configuration file and the address of a Trivial File Transfer Protocol server. The configuration file contains encodings for the modem's operational parameters. The parameters—enumerated in Appendix C (pp. 227-275)—include such settings as maximum number of customer premise equipment (CPE), maximum upstream channel data rate setting, and maximum downstream channel data rate setting. While most of the encodings are optional, there are a number of required settings as specified in Section D.2.2 (pp. 279-280).

The receiving CM verifies that the configuration file has not been altered by checking the Message Integrity Check (MIC) included with the file. The CM then sends the contents of the configuration file to the CMTS as part of the registration process as set forth in Section 9.2.8 (pp. 168–174). After the CMTS accepts the CM's registration request, the CM is permitted to send and receive traffic on the network. The CMTS and CM both populate fields in memory with the values from an accepted configuration file.

Both the CM and the CMTS save some of the parameters from the configuration file. During the course of operation, the CMTS and CM may reference the saved parameters. If set, the maximum downstream and/or upstream traffic rates for each CM are stored at the CMTS. As traffic destined for a modem or one of its CPEs arrives at the CMTS, the CMTS references the stored maximum downstream rate configuration setting as set forth in Section C.1.1.4.2 (p. 229) for that modem to ensure that the traffic rate to the modem does not exceed the setting. Traffic arriving at a rate greater than permitted may be traffic shaped or dropped as set forth in Section C.1.1.4.2 (p. 229).

When a CM has traffic to send on the upstream, it must request the use of the upstream and the CMTS must grant the modem data transmission opportunities before the traffic may be sent. A CM that is rate-limited for upstream transmissions will not be granted opportunities to send traffic at a rate greater than its configured maximum upstream rate. The CM should check its stored maximum upstream rate configuration setting received from the configuration file and not request to send traffic at a rate that exceeds such setting. However, since the CM is an "untrusted" network device, the CMTS checks a modem's transmission requests against the maximum upstream rate configuration setting stored at the CMTS. In this way, the CMTS policies a modem's data transmission requests and implicitly denies requests exceeding maximum allowances by not granting data transmission opportunities as set forth in Section

C.1.1.4.3 (p. 230). If there is no setting for either the upstream or the downstream, the CM's maximum transmission rate is not limited by policy; the limitation in such case comes from the physical maximum of the system and competition for bandwidth with other modems.

The stored values for Maximum Upstream and Maximum Downstream Data Rates are accessible via the Simple Network Management Protocol (SNMP). Some CMTS vendors arrange the SNMP tables so that the values are stored as read-write or read-create, which means that the values may be created if non-existent and altered if in existence. Other CMTS vendors arrange the SNMP Tables as read-only, in which case the values therein may be read but not altered or created via SNMP messaging.

The maximum downstream rate setting and/or the maximum upstream rate at the CMTS may affect the data transfer rate to and from a modem, since traffic arriving from the network destined for a CM or one of its CPEs is forwarded onto the downstream at a rate no greater than that configured in the maximum downstream rate. Similarly, the CMTS will grant to a modem transmission opportunities on the upstream at a rate no greater than that specified in the maximum upstream rate value stored at the CMTS.

Respectfully submitted,

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	09/800,735
Filing Date	3/7/2001
First Named Inventor	McKinnon, III, Martin W.
Group Art Unit	
Examiner Name	
Attorney Docket Number	10263-33243

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	5,857,193		Sutcliffe et al.	01/01/1999	
	2	5,935,218		Beyda et al.	08/10/1999	
	3	5,963,963		Schmuck et al.	10/05/1999	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

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[1] Unique citation designation number. [2] See attached Kinds of U.S. Patent Documents. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 2

Complete if Known	
Application Number	09/800,735
Filing Date	3/7/2001
First Named Inventor	McKinnon, III, Martin W.
Group Art Unit	
Examiner Name	
Attorney Docket Number	10263-33243

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	4	Data-Over-Cable Service Interface Specifications; Radio Frequency Interface Specification; SP-RF1v1.-104-00047 Interim Specification; 2000 Cable Television Laboratories, Inc. Pages 229-231, 263; 121-141; 157-217; and 277-283.	

Examiner Signature		Date Considered	

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